

Short reports

Study of acute flaccid paralysis surveillance system in Kerman (Iran) for one decade

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Abstract: *Background* — During the past decade, polio eradication has stalled globally. Acute flaccid paralysis (AFP) surveillance is a key strategy for monitoring the progress of polio eradication. All AFP patients who referred to expert committee were evaluated about the causes. *Methods* — This case series study is the result of activities for one decade of expert AFP committee of Kerman University of Medical Sciences from 2002-2011, with coverage of more than 2,650,000 populations and 730,677 child with age of ≤15 years old. All patients have gone under diagnostic and therapeutic managements. *Results* — The total cases referred to Kerman expert committee of AFP for ten years were 147 cases. In our study the incidence of AFP was 2.016 per 100000 populations for one year. The most common causes of AFP were Guillain-Barre syndrome (GBS). Other causes of AFP were; stroke, synovitis, myelitis, seizures, cerebral palsy, viral infections, tumors, cerebellitis and non-polio AFP. The rate of GBS in our study was 0.96 per 100000 in children 15 years old or smaller, and more in male. In this study the incidence rate in cities with low mean temperature was higher than in cities with high mean temperature. *Conclusion* — We had no polio case in this period. The most common cause of AFPs was Guillain-Barre syndrome. The incidence of GBS was higher in areas with low mean temperature.

Keywords: Polio eradication, Acute flaccid paralysis, Guillain-Barre syndrome

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Introduction

During the past decade, polio eradication has stalled globally. In Iran there is a unit in charge of polio eradication activities. In each province, the Vice-chancellor of the University of Medical Sciences is responsible for implementation of polio eradication activities, which include acute flaccid paralysis (AFP). AFP surveillance is a key strategy for monitoring the progress of polio eradication and is a sensitive instrument for detecting potential poliomyelitis cases and poliovirus infection [1]. All AFP patients who referred to expert committee were evaluated about the causes. There are several causes for differential diagnosis, Guillain Barre Syndrome (GBS), cerebral infarction, myelitis, cerebral palsy, synovitis, encephalitis, tumors, peripheral neuropathy, seizures and metabolic disorders [1]. The most important and most common is Guillain Barre syndrome, since the disappearance of polio in 2000 in Bangladesh, a high incidence of acute flaccid weakness in Bangladeshi children (3.25 cases per 100,000) is still present but is now related mostly to GBS. Frequent exposure to enteric pathogens at an early age may increase this incidence of GBS [2].

GBS is an autoimmune-mediated disease with environmental triggers (eg, pathogenic or stressful exposures). Several infections (e.g., Epstein-Barr virus, cytomegalovirus, hepatitis, varicella, other herpes viruses, *Mycoplasma pneumoniae*, *Campylobacter jejuni*) as well as immunizations have been known to precede or to be associated with the illness. *Campylobacter jejuni* seems to be the

most commonly described pathogen associated with GBS. Occasionally, surgery has been noted to be a precipitating factor, and venom snake has been reported too [2].

Males appear to be at greater risk for GBS than females. This increased predilection for GBS has also been reported as a male-to-female ratio of 1.2:1 in a review of children with GBS. A similar ratio of 1.26:1 was found in a prospective study of 95 children with GBS in Western Europe [3]. Some expert committee of AFP in University of medical sciences in Iran published the results of polio eradications [4].

In this study we evaluated the causes of AFP in children with ages 15 years old or below in Kerman province at the time of ten years after eradication of polio.

Material and Methods

This case series study is result of activities for one decade of expert AFP committee of Kerman University of medical sciences from 2002-2011 by helping of Vice-chancellor of health evaluated. The area of this is Kerman province (except Rafsanjan city due to independent Rafsanjan University medical science from Kerman University of medical sciences) with more than 2,650,000 populations and 730,677 child with age of ≥15 years old. The data entered in a special form. The variables included were; age, sex, city of life, month, season and year of involvement, the outcome after 60 days. All patients have gone under diagnostic and

therapeutic managements [5]. The Guillain-Barre syndrome patients examined and managed by neurologist.

The data were described by SPSS version 20.

Results

The total cases referred to Kerman expert committee of AFP for ten years (1381-1390) were 147 cases of whom 18 cases were Afghan immigrants. The distribution of AFP cases (GBS and Non-GBS) per years showed in *Table 1*.

Seasonal distribution of AFP (GBS and Non-GBS) cases showed in *Table 2*.

Age and sex distribution of AFP (GBS and Non-GBS) cases showed in *Table 3*.

The final diagnosis of AFP cases showed in *Table 4*.

We followed the GBS cases at 60 days after AFP beginning and the rate of recovery evaluated. 3 cases have died, 18 cases have complete recovery, 36 cases have mild disability, 8 cases have moderate disability, and 5 cases have not recovery.

Discussion

AFP flaccid paralysis is a clinical syndrome characterized by rapid onset of weakness, including (less frequently) weakness of the muscles of respiration and swallowing, progressing to maximum severity within several days to weeks. The term "flaccid" indicates the absence of spasticity or other signs of disordered central nervous system motor tracts such as hyperreflexia, clonus, or extensor plantar responses [6].

The differential diagnosis of AFP varies considerably with age. No single operational clinical case definition of AFP or paralytic poliomyelitis that combines both high sensitivity and high specificity has emerged [7, 8].

The annual incidence globally is 1-2 per 100,000 populations [9]; however, there are differences by region and ethnicity. Guillain-Barre syndrome is an important cause of AFP among children, but rarely, cases in infants have been reported [10]. The incidence of AFP 1.6/100,000 at any age, and 1 per 100,000 in children under 15 years old, the GBS was the most common diagnosis, 0.8 per 100,000 [11, 12]. In our study the incidence of AFP is 2.016 per 100,000 populations for one year. In this study the incidence is higher than some reports; this finding may be due to variation of differential diagnosis. The overall incidence of GBS was between 1.1/100,000/year and 1.8/100,000/year in Europe and North America. The incidence of GBS increased with age after 50 years from 1.7/100,000/year to 3.3/100,000/year [13, 14]. The overall incidence in military person of USA was 2.28/100,000 persons, is higher than general population, the majority of cases were male [15]. In Sweden the incidence is moderately higher and is more in male than female [16].

The rate GBS in our study is 0.96 per 100,000 in children 15 years old or smaller. In this study 47% of AFP cases were GBS, in a study of Iran this rate is 0.88-1.3/100,000 child ≥ 15 years old [17], but in WHO report this is 20% [18]. In Oman country the rate GBS is 0.45/100,000 and it's lower than our study [19], may be due to high mean temperature in Oman country like the southern cities of Kerman Province, but in WHO report this rate is 0.5-1.5% [20]. Other causes of AFP are include; stroke, synovitis, myelitis, seizures, cerebral palsy, viral infections, tumors, cerebellitis and Non-polio AFP (*Table 4*). These findings are same as other reports [21-25]. In this study the rate of incidence in cities with low mean

temperature higher than in cities with high mean temperature. This finding is same as other nervous system autoimmune disorders (multiple sclerosis, GBS) to under published research of first author. This findings approved the low mean temperature of area may be a positive role on incidence of autoimmune disease.

In this study we find an increase incidence of GBS at 1387 (2008-2009), but we can't find any factor about it (*Table 1*). May be an infection or vaccination and other factors have involved, like the increase incidence after NiH1 vaccination [26].

The incidence rate of GBS is more in spring season (*Table 2*). In this season the allergic reactions are more.

Table 1. Distribution of AFP cases (GBS and Non-GBS) on the years

Year	GBS	Non-GBS	Total
1381 (2002-2003)	7	2	9
1382 (2003-2004)	4	3	7
1383 (2004-2005)	2	8	10
1384 (2005-2006)	9	1	10
1385 (2006-2007)	6	20	26
1386 (2007-2008)	6	11	17
1387 (2008-2009)	15	9	24
1388 (2009-2010)	8	8	16
1389 (2010-2011)	4	6	10
1390 (2011-2012)	9	9	18
Total	70	77	147

Table 2. Distribution of AFP cases on the seasons

Season	GBS	Non-GBS	Total
Spring	24	24	48
Summer	21	15	36
Fall	14	23	37
Winter	11	15	26

Table 3. Distribution of AFP cases on age and sex

Cases	GBS	Non-GBS	Total
Age, M \pm SD	5.8 \pm 3.9	4 \pm 3	4.9 \pm 3.6
Male, n (%)	38 (54.3%)	42 (54.5%)	80 (54.4%)
Female, n (%)	32 (45.7%)	35 (45.5%)	67 (45.6%)
Total, n (%)	70	77	

M, mean; SD, standard deviation.

Table 4. Final diagnosis of AFP cases

Final Diagnosis	Number
GBS	70
Stroke	8
Synovitis	19
Electrolite disturbances	9
Seizures	5
Cerebral Palsy	4
Encephalitis or Viral infections	7
Tumors (Brain or Spinal)	4
Cerebellitis	2
Non-polio AFP	1
TB or Abscess of Spine	3
Trauma of Spine	2
Transvers myelitis	3
Poisoning	1

Table 5. The outcome of GBS cases after 60 days

Outcome	Number	Percent
Complete recovery	18	26%
Mild disability	37	52%
Moderate disability	8	11%
Sever disability	5	7%
Death	3	4%

Some of patients are non-Iranian nationality (from Afghanistan), because there are a lot of immigration from Afghanistan in Kerman. The mean age of patients in children with 15 years old or smaller in this study is 5.8 (Table 3), this finding as same as other reports [27, 28]. In this study the patients are often male (Table 3), this finding is same as other reports from other countries [29, 30]. GBS incidence increased by 20% for every 10-year increase in age; the risk of GBS was higher for males than females [31]. Majority of patients improved with supportive treatment alone, in this study after 60 days follow up more than 75% cases full recovered or have only mild disability, the 18% cases have moderate to severe disability, and 4% of patients with GBS have died (Table 5). In a study the rate recovery after 3 months reported 50% and the rate of death was 7.4% [32]. The differences may be due to low age of our patients that were 15 years old or smaller. In general, the outcome of GBS is more favorable in children than in adults. Deaths are relatively rare, especially if the disorder is diagnosed and treated early. However, the recovery period is long, often weeks to months, with a median estimated recovery time of 6-12 months. In one small pediatric series, the median time from onset of symptoms to complete recovery was 73 days. Full recovery within 3-12 months is experienced by 90-95% of pediatric patients with GBS. Between 5% and 10% of individuals have significant permanent disabilities. The prognosis of GBS is generally favorable, but it is a serious disease with a mortality of approximately 10% and approximately 20% of patients are left with severe disability [33, 34].

Overall mortality rate in childhood GBS is estimated to be less than 5%; mortality rates are higher in medically underserved areas. Mechanically ventilated patients constitute the majority of GBS patients with a poor outcome, and mortality remains substantial in this subgroup (20%). Although recovery from severe GBS may be prolonged, most survivors regain independent ambulation [35]. Persistent disability is seen in 20–30% of adult patients but is less common in children [36, 37]. GBS causes severe persistent disability in 14% of patients at 1 year. Loss of full strength, persistent pain and need for professional change occurs in about 40%. Mortality is of about 4% within the first year [38].

Conclusion

In sum, GBS, synovitis and Electrolyte disturbances were the most common diagnoses. There was no proven case of poliomyelitis.

Conflict of interest: none declared.

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